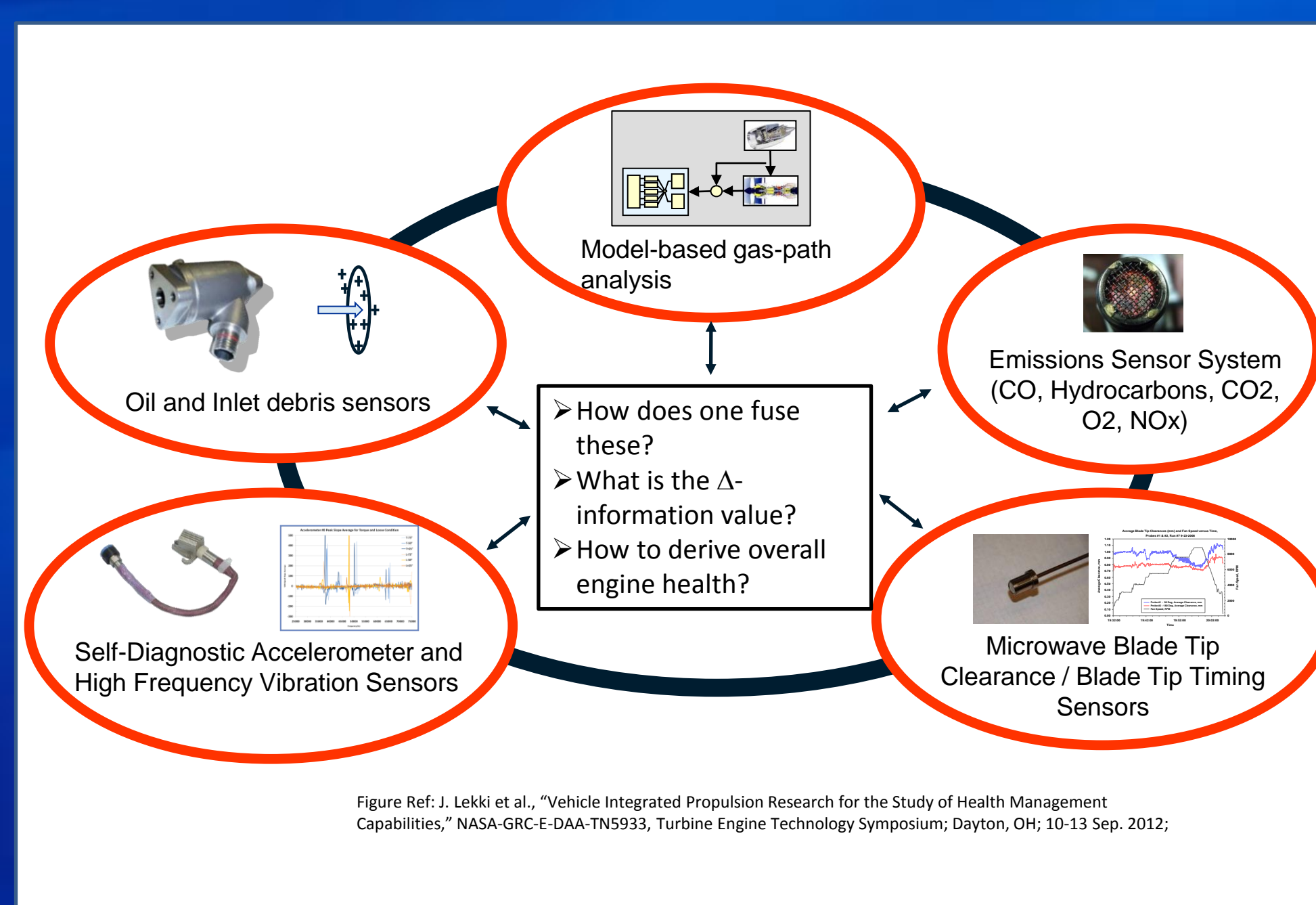


Description

PIFF is a fusion framework that can be adapted to a wide variety of evidence such as (1) conventional engine sensors, (2) specialized health monitoring sensors (tip clearance, oil debris, particle detection), and (3) outputs made available from high-fidelity engine models running in real-time. This effort will result in advancing technology to derive overall engine health needed for safety assessment.

Benefits

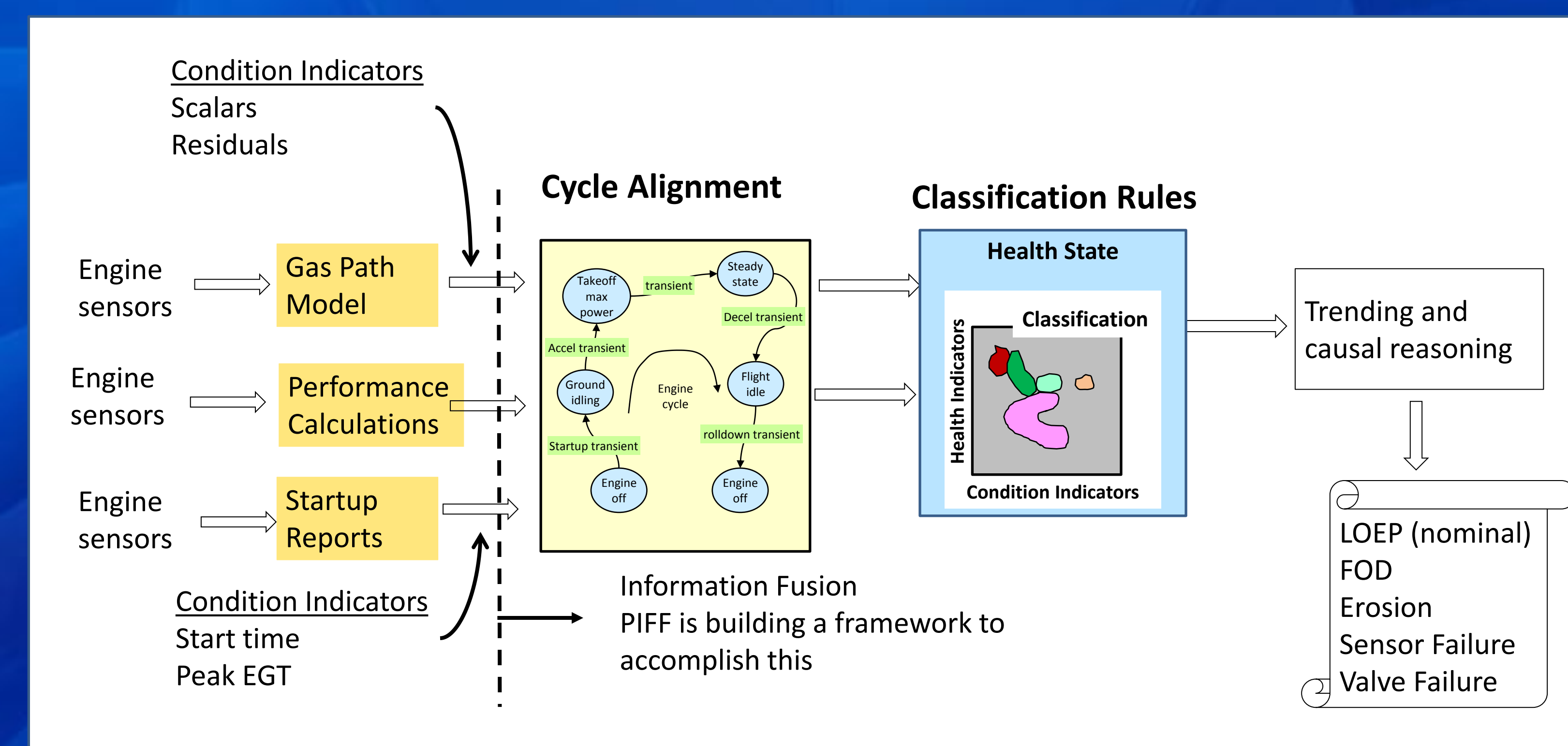
PIFF defines a clear delineation between evidence generation, the inference function and the system reference model that contains engine specific details. This partitioning allows the same fusion software code to be reused on a variety of engine types while minimizing certification and qualification costs for deploying PIFF.



Approach

1. Standardize the "Condition Indicator (CI) Interface" from
 - (a) dedicated health monitoring sensor
 - (b) dedicated proprietary software running within the engine controller
 - (c) Real-time engine gas path model
2. Provide an expression for describing overall propulsion health
 - (a) building on semantics used by onboard maintenance systems
3. Data driven software design together with an authoring environment that allows the user to
 - (a) specify and hence customize it to a given engine, available sensors, and available engine gas path models
 - (b) specify the best-suited fusion math operators
 - (c) adjust threshold and internal parameters

Gas Path Information Fusion



Recent Results

We completed the first year of this three year program. Primary accomplishment was a complete definition of the fusion framework. Specific deliverables include:

1. Requirements Definition and Architecture Document
2. Identification of engine test for evaluation
 - (a) Sand ingestion test – accelerated missions with sand fed to the engine
 - (b) Bearing test – one of the engine bearing was operated to near failure

Future Work

1. Develop the software modules for information fusion algorithms
2. Demonstrate that PIFF can be configured to provide high confidence engine health status using the data from the two engine tests.

